

Status Report No. 6

for

National Aeronautics and Space Administration Grant

NsG 280-62

on

THEORETICAL RESEARCH ON THE PERIODIC MOTION AND STABILITY  
OF A SMALL MASS UNDER THE GRAVITATIONAL ATTRACTION OF  
TWO HEAVY BODIES

N 66-81017

FACILITY FORM 808

(ACCESSION NUMBER)

(THRU)

3  
(PAGES)

None  
(CODE)

CR-69193  
(NASA CR OR TMX OR AD NUMBER)

(CATEGORY)

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Report period:

March 1, 1965  
to  
August 31, 1965

NASA Grant NsG 280-62

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Further calculations on the restricted 3-body problem have been made for a class of asymmetric orbits, as a function of mass-ratio over the range  $-1 \leq \gamma < 0.75$ .

Results of previous work have been published by J. H. Bartlett and C. A. Wagner in an article entitled "The Restricted Problem of Three Bodies (II)", Matematisk-fysiske Skrifter, D. K. Danske Vid. Selskab, Bind 3, nr. 1, pp. 1-53.

The question of stability of orbits is being studied for the non-linear system  $d^2x/dt^2 + p(t) x^3 = 0$ , where  $p(t)$  is a periodic function of the time. Tentatively, it appears that there are invariant regions in the sense of Arnol'd and Moser, but further work is needed, and is being done, to define these regions precisely. Once this is completed, the results should be applicable to the restricted problem of three bodies.

# LIST OF PUBLICATIONS

Tech. Rept. #1. The restricted problem of three bodies (1964).

Tech. Rept. #2. The restricted problem of three bodies (II) (1965).

J. H. Bartlett. The restricted problem of three bodies. K. Danske Videns.  
Selskab, Mat-fys Skr 2, No. 7 (1964), 48 pp.

J. H. Bartlett and C. A. Wagner. The restricted problem of three bodies (II).  
Kgl Danske Videns. Selskab, Mat-fys Skr 3, No. 1 (1965), 53 pp.